

We claim:

1. An aqueous polishing composition for removing a portion of a semiconductor substrate comprising:
at least one aqueous engineered copolymer, wherein the engineered copolymer comprises a first moiety and a second moiety, the first moiety comprising a hydrophilic functional group and the second moiety providing structural rigidity to the aqueous engineered copolymer and the second moiety being less hydrophilic than the first moiety; and the aqueous polishing composition is abrasive-free.
2. The polishing composition in accordance with Claim 1 wherein the first moiety comprises a hydrophilic functional group with an affinity for the semiconductor substrate.
3. The polishing composition in accordance with Claim 1 wherein the second moiety comprises a hydrophobic functional group which interacts with a surface of the polishing pad.
4. The polishing composition in accordance with Claim 1 wherein the engineered copolymer is selected from a group consisting of random, block, branched and alternating copolymers.
5. The polishing composition in accordance with Claim 1 wherein at least one engineered copolymer is present at a concentration of less than about 1% by weight, an oxidizing agent up to about 15% by weight, a complexing agent up to about 3% by weight and an inhibitor up to about 2% by weight of the polishing composition.
6. The polishing composition in accordance with Claim 5 further having a pH less than 5 wherein the oxidizing agent is hydrogen peroxide, the complexing agent is malic acid and the inhibitor is an aromatic triazole.
7. The polishing composition in accordance with Claim 1 wherein the copolymer is derived from a mixture comprising acrylic acid monomer and methacrylic acid monomer at a mole ratio of acrylic acid monomer to methacrylic acid monomer of about 1:20 to about 20:1.
8. The polishing composition in accordance with Claim 7 wherein the copolymer has a weight average molecular weight in a range of about 20,000 to about 30,000.

9. The polishing composition of Claim 1 wherein the engineered copolymer comprises the reaction product derived from a mixture of two or more ethylenically unsaturated monomers.
10. The polishing composition in accordance with Claim 9 wherein at least 50% by weight of the mixture is an unsaturated carboxylic acid monomer.
11. An aqueous polishing composition for removing a portion of a semiconductor substrate comprising:
at least one aqueous engineered copolymer, wherein the engineered copolymer comprises a first moiety and a second moiety, the first moiety comprising a hydrophilic functional group and the second moiety providing structural rigidity to the aqueous engineered copolymer and the second moiety being less hydrophilic than the first moiety; and the copolymer is derived from a mixture comprising acrylic acid monomer and methacrylic acid.
12. The polishing composition in accordance with Claim 11 wherein the first moiety comprises a hydrophilic functional group with an affinity for the semiconductor substrate.
13. The polishing composition in accordance with Claim 11 wherein the second moiety comprises a hydrophobic functional group which interacts with a surface of the polishing pad.
14. The polishing composition in accordance with Claim 11 wherein the engineered copolymer is selected from a group consisting of random, block, branched and alternating copolymers.
15. The polishing composition in accordance with Claim 11 wherein at least one engineered copolymer is present at a concentration of less than about 1% by weight, an oxidizing agent up to about 15% by weight, a complexing agent up to about 3% by weight and an inhibitor up to about 2% by weight of the polishing composition.
16. The polishing composition in accordance with Claim 15 further having a pH less than 5 wherein the oxidizing agent is hydrogen peroxide, the complexing agent is malic acid and the inhibitor is an aromatic triazole.

17. The polishing composition in accordance with Claim 11 wherein the mixture of acrylic acid monomer and methacrylic acid monomer has a mole ratio of acrylic acid monomer to methacrylic acid monomer of about 1:20 to about 20:1.
18. The polishing composition in accordance with Claim 17 wherein the copolymer has a weight average molecular weight in a range of about 20,000 to about 30,000.
19. The polishing composition of Claim 11 wherein the engineered copolymer comprises the reaction product derived from a mixture of two or more ethylenically unsaturated monomers.
20. The polishing composition in accordance with Claim 19 wherein at least 50% by weight of the mixture is an unsaturated carboxylic acid monomer.